

# Disparities in Connectivity & Access to Health Care in the Redwood Coast Region

By Jessica Van Arsdale, MD, MPH

*Results from the Rural Health Information Survey, 2006, indicate that a high percentage of households in the Redwood Coast Region have poor connectivity: phones, computers and the Internet. Households with poor connectivity are about twice as likely to have poor access to health care as households with good connectivity.*

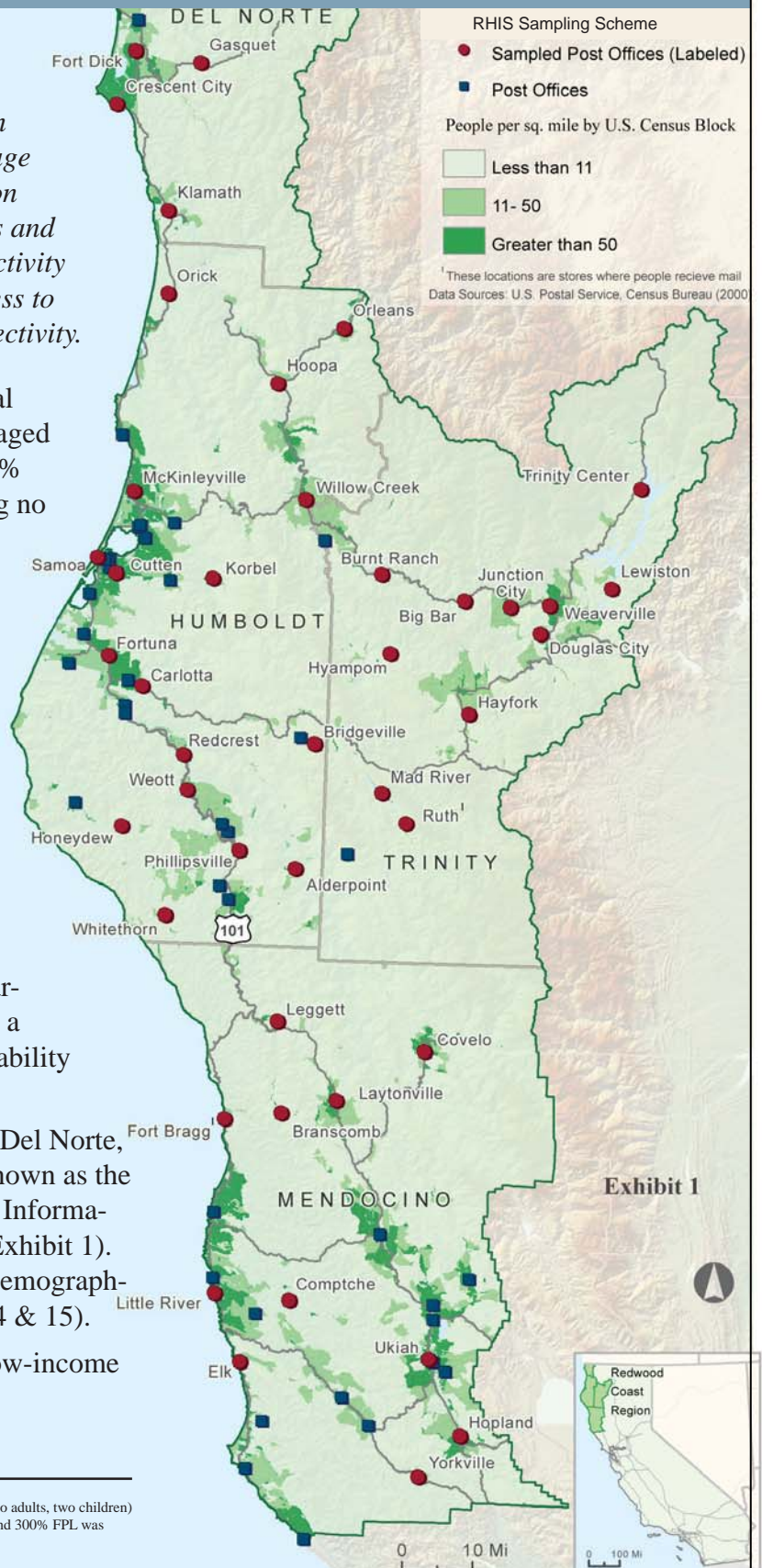
Households with incomes below the federal poverty level (FPL)\* are clearly disadvantaged with up to 14.2% reporting no phone, 45.1% reporting no computer and 55.4% reporting no internet access in their home.

These statistics improve as the socioeconomic status of the household improves; however, even for those with incomes above the FPL there is limited access to some of these basic amenities. Areas with low population density are also less likely to have these amenities compared to areas with higher population density.

Access to phones, computers and the Internet can impact health through access to health information and health care. Nearly a third to half of the households without a computer, Internet or phone reported an inability to get needed health care.

California's four most northern counties – Del Norte, Humboldt, Trinity and Mendocino – are known as the Redwood Coast Region. The Rural Health Information Survey sampled these four counties (Exhibit 1). A description of the methods and sample demographics are at the end of this report (Exhibits 14 & 15).

A total of 41.4% of the sample lives in a low-income household (<200% FPL).



\* The Federal Poverty Level (FPL) varies by household size. For a family of four (two adults, two children) the 2006 Federal Poverty Level (100% FPL) was \$20,444, 200% FPL was \$40,888 and 300% FPL was \$61,332.

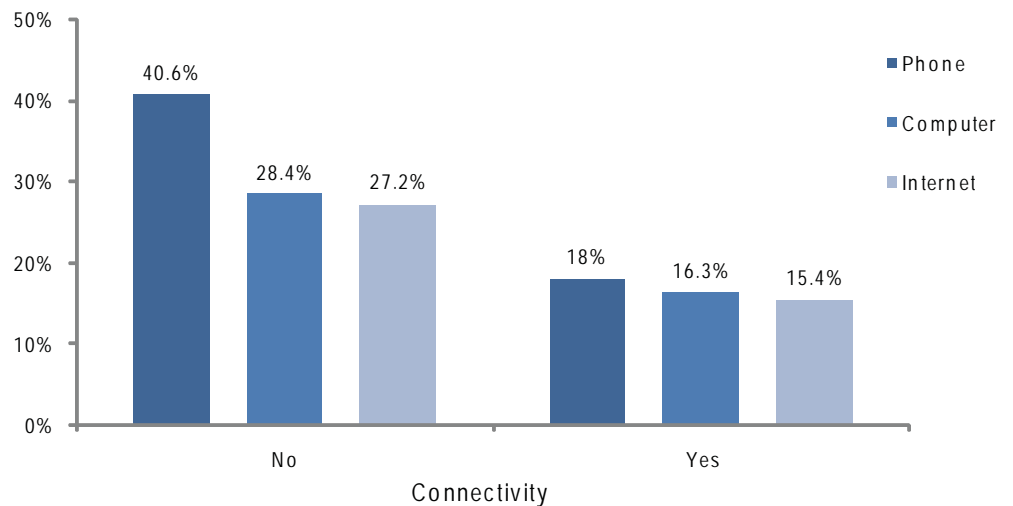
# Connectivity and Access to Health Care

*Respondents with poor connectivity (no phone, computer or Internet in their home) were much more likely to report difficulties obtaining needed health care compared to respondents with these household amenities.*

Respondents without a phone in their home were 2.26 times as likely to report not being able to get needed health care in the last 12 months as respondents with a phone in their home. Respondents without a computer or Internet in their home were 1.7 and 1.8 times, respectively, more likely to report not being able to get needed health care in the last 12 months as respondents with these amenities (Exhibits 2 & 3).

*Nearly half of the respondents (40.6%) without a phone in their home reported they were not able to get needed health care in the last 12 months compared to 18% of respondents in households with a phone (Exhibits 2 & 3).*

**Exhibit 2: Not Able to Get Needed Health Care by Connectivity (Telephone, Computer & Internet Access)**



Source: Rural Health Information Survey, 2006, California Center for Rural Policy

**Exhibit 3: Number of Respondents Who Were Not Able to Get Needed Health Care in Last 12 Months by Connectivity**

Connectivity			Unable to Get Needed Health Care	
		Frequency	Frequency	%
Telephone	No	133	54	40.6
	Yes	2383	428	18.0
	Total	2516	482	19.2
Computer	No	557	158	28.4
	Yes	1938	316	16.3
	Total	2495	474	19.0
Internet Access	No	766	208	27.2
	Yes	1720	265	15.4
	Total	2486	473	19.0

Source: Rural Health Information Survey, 2006, California Center for Rural Policy

# Access to Phones: The Impact of Poverty and Place

*Respondents living below 100% poverty were 8.4 times more likely to report not having a phone in their home compared to respondents living at or above 300% poverty.*

A phone is essential for making medical appointments, coordinating medical care and calling for help during a medical emergency.

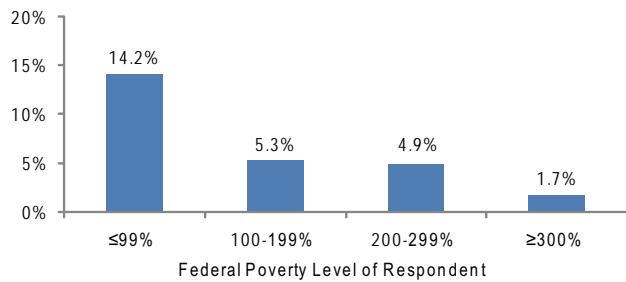
Not only is it important to consider lack of phones impacting access to health care, it is also important to consider this when conducting surveys intended to elicit responses from a broad cross section of the population. As illustrated by this survey, a phone survey has the potential of excluding segments of the population who are living in the poorest households.

## The Impact of Poverty

Approximately 6% of the respondents reported no phone in their home, but this increases to 14.2% for respondents living in the poorest households (Exhibits 4 & 5).

There was a significant difference between poverty levels with respect to percentage of respondents without a phone in the home (however, the difference between respondents living in households with incomes from 100% to 199% FPL and from 200% to 299% FPL was not statistically significant).

**Exhibit 4: No Phone in the Home by Federal Poverty Level of Respondents (n=2,552)**



Source: Rural Health Information Survey, 2006, California Center for Rural Policy  
 \* The lowest % of FPL is the poorest household.

**Exhibit 5: Number of Respondents with No Phone in the Home by Federal Poverty Level**

Federal Poverty Level	No Phone in the Home		
	Frequency	Frequency	%
≤99%	415	59	14.2
100%-199%	639	34	5.3
200%-299%	489	24	4.9
≥300%	1009	17	1.7
Total	2552	134	5.3

Source: Rural Health Information Survey, 2006, California Center for Rural Policy

## The Impact of Place

Of the respondents who live in low population density areas (≤50 people per square mile), 6.9% reported no phone in their home compared to 3.7% of respondents who live in higher population density areas. Although this difference is small it is statistically significant. No significant difference was found between those who live in an area with <11 people per square mile and those who live in an area with 11-50 people per square mile (Exhibit 6).

When comparing counties there was no statistically significant difference found between counties with respect to respondents not having a phone in the home (Del Norte 4.3%, Humboldt 6.7%, Trinity 4.8% and Mendocino 6.4%).

**Exhibit 6: Number of Respondents with No Phone in the Home by Population Density**

Population Density	No Phone in the Home		
	Frequency	Frequency	%
<11 people per square mile	1041	70	6.7
11-50 people per square mile	832	59	7.1
>50 people per square mile	1054	39	3.7
Total	2927	168	5.7

Source: Rural Health Information Survey, 2006, California Center for Rural Policy

# Access to Computers and Internet: The Impact of Poverty & Place

Nearly a third (31.2%) of the respondents reported having no Internet access in their home and nearly a quarter (22.7%) reported having no computer in their home.

Computers and the Internet are becoming increasingly important health related tools. Studies have estimated that 40 to 80% of adults in the United States use the Internet to obtain advice or information about health, health care and medical insurance.<sup>1,2</sup> The Rural Health Information Survey found that only 30.2% of respondents reported using the Internet as a usual source for learning about health. Likely this is due in part to the low accessibility of Internet for many of the survey respondents.

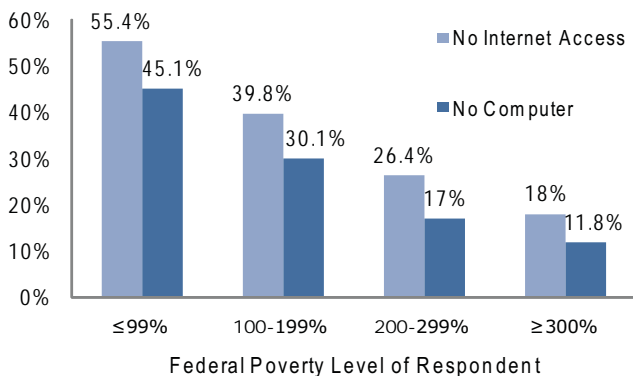
The Internet can be an important tool for rural people by providing access to health information, connecting to others with similar health problems and sharing strategies for self-management.<sup>3</sup> The Internet has been shown to be an effective tool in improving knowledge, attitudes and symptoms of depression, helping people quit smoking, increasing physical activity, improving diet, lowering cholesterol levels, improving outcomes for prevention and management of diabetes, osteoarthritis and other conditions as well as providing support for women with breast cancer and patients with AIDS.<sup>4,5</sup>

Home Internet access also has the potential to improve health care delivery by connecting patients to their providers and allowing for exchange of information such as blood pressure and blood sugar measurements that can be transmitted electronically, providing chronic disease management that may otherwise be difficult for some due to transportation problems.

## The Impact of Poverty

Respondents living in the poorest households were the most likely to report no Internet access or computer in their home. Of the respondents who reside in households with incomes below the FPL, 55.4% reported no Internet access and 45.1% reported no computer in their home. As the poverty level of the respondent improves, the percentage without a computer or Internet access in the home decreases. There is a statistically significant difference between each group (Exhibits 7,8,9).

**Exhibit 7: No Computer or Internet Access in the Home by Federal Poverty Level of Respondents**



Source: Rural Health Information Survey, 2006, California Center for Rural Policy

**Exhibit 8: Number of Respondents with No Internet Access in the Home by Federal Poverty Level**

Federal Poverty Level	No Internet Access in the Home		
	Frequency	Frequency	%
≤99%	404	224	55.4
100%-199%	633	252	39.8
200%-299%	485	128	26.4
≥300%	1006	181	18.0
Total	2528	785	31.1

Source: Rural Health Information Survey, 2006, California Center for Rural Policy

**Exhibit 9: Number of Respondents with No Computer in the Home by Federal Poverty Level**

Federal Poverty Level	No Computer in the Home		
	Frequency	Frequency	%
≤99%	408	184	45.1
100%-199%	635	191	30.1
200%-299%	487	83	17.0
≥300%	1008	119	11.8
Total	2538	577	22.7

Source: Rural Health Information Survey, 2006, California Center for Rural Policy

# Computers and Internet Access *continued*

## The Impact of Place

Of the respondents who live in low population density areas ( $\leq 50$  people per square mile), 34.3% reported no Internet access in their home compared to 27.4% of respondents who live in a higher population density area ( $>50$  people per square mile). This difference is small, but statistically significant.

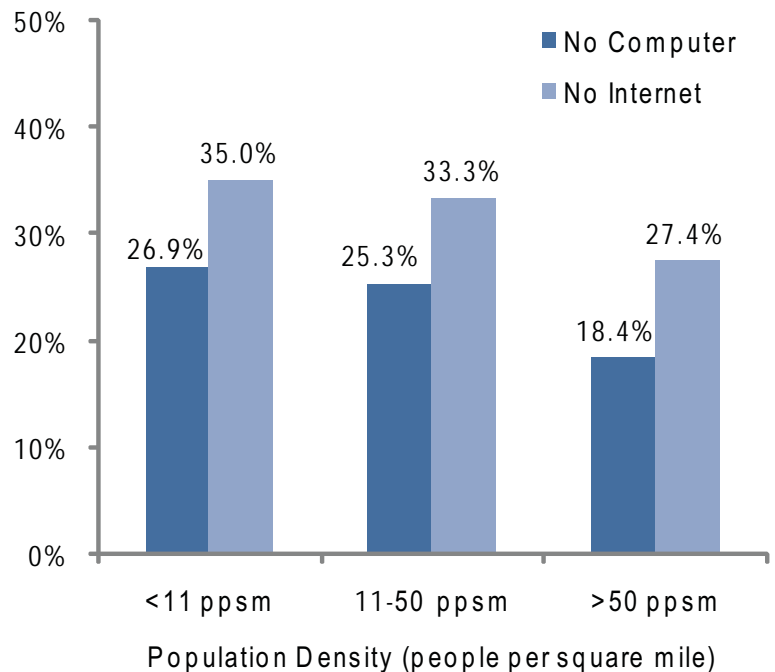
Similarly, 26.2% of respondents living in low population density areas ( $\leq 50$  people per square mile) reported no computer in their home compared to 18.4% of respondents who live in a higher population density area ( $>50$  people per square mile). Although this difference is small it is statistically significant. For both computers and Internet, no significant difference was found between those who live in an area with  $<11$  people per square mile and those who live in an area with 11-50 people per square mile (Exhibits 10, 11 & 12).

When comparing counties there was no statistically significant difference found between counties with respect to respondents not having Internet access in the home (Del Norte 33.7%, Humboldt 33.9%, Trinity 29.5% and Mendocino 30.5%).

Similarly, there was no statistically significant difference found between counties with respect to respondents not having a computer in the home (Del Norte 26%, Humboldt 25%, Trinity 20.9% and Mendocino 22.5%).

Analysis on a sub-county level revealed that lack of home Internet access ranged from 14.3% to 70% depending on the location (Exhibit 13).

**Exhibit 10: No Computer or Internet Access in the Home by Population Density**



Source: Rural Health Information Survey, 2006, California Center for Rural Policy

**Exhibit 11: Number of Respondents with No Computer in the Home by Population Density**

Population Density		No Computer in the Home	
	Frequency	Frequency	%
<11 people per square mile	1034	278	26.9
11-50 people per square mile	818	207	25.3
>50 people per square mile	1051	193	18.4
Total	2903	678	23.4

Source: Rural Health Information Survey, 2006, California Center for Rural Policy

**Exhibit 12: Number of Respondents with No Internet Access in the Home by Population Density**

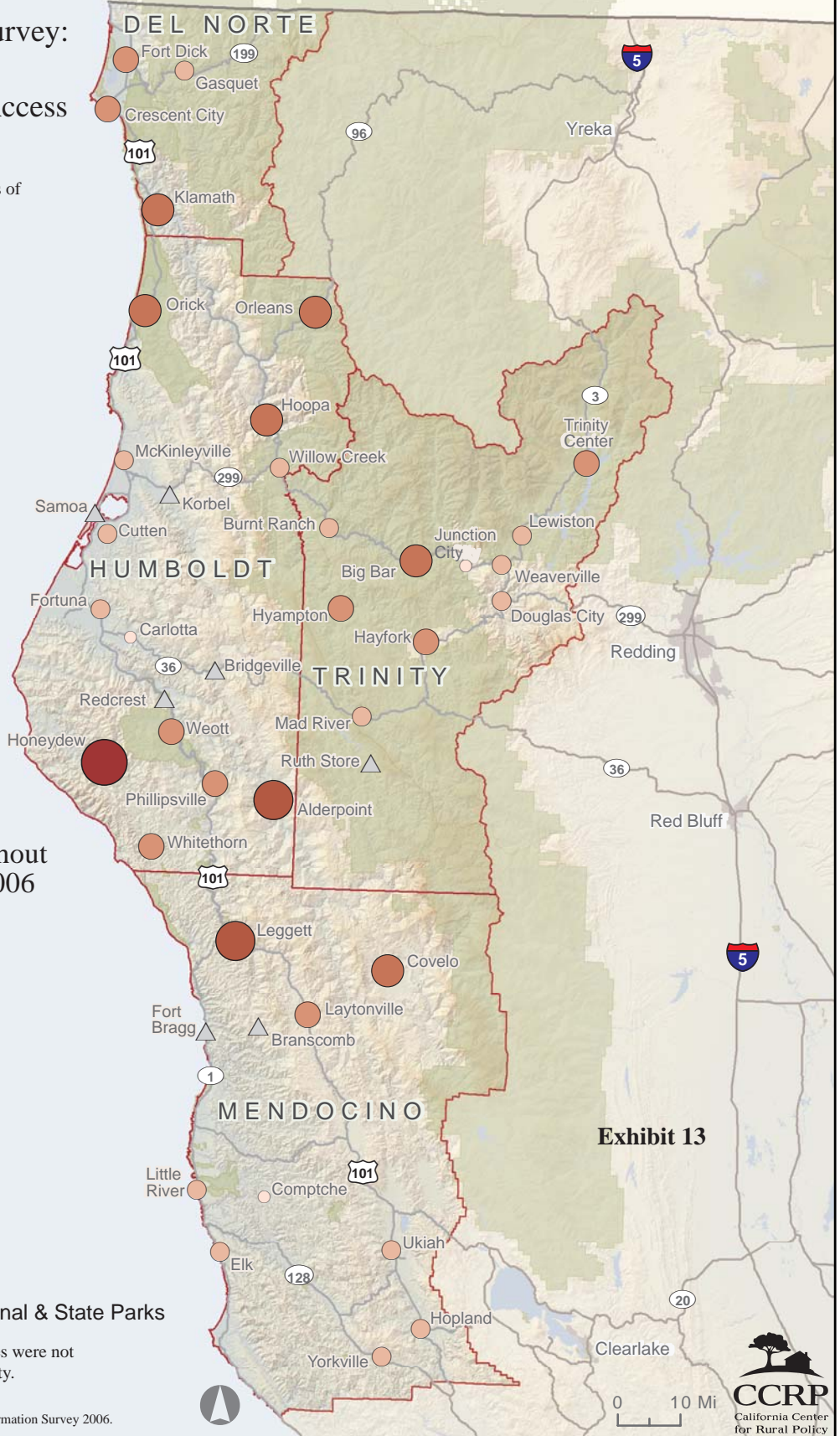
Population Density		No Internet Access in the Home	
	Frequency	Frequency	%
<11 people per square mile	1031	361	35.0
11-50 people per square mile	813	271	33.3
>50 people per square mile	1049	287	27.4
Total	2893	919	31.8

Source: Rural Health Information Survey, 2006, California Center for Rural Policy

# Lack of In-Home Internet Access

## Rural Health Information Survey: Percent\* of Respondents Without In-Home Internet Access

\* Percentages are shown for survey respondents of each sampled post office.



### Percent of Respondents Without In-Home Internet Access, 2006

- 60 - 70
- 50 - 59
- 40 - 49
- 30 - 39
- 20 - 29
- 14 - 19
- △ Low sample size\*\*

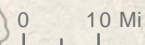
### Public Lands

- National Forests, National & State Parks

\*\* Post offices with less than 20 survey responses were not included in analysis due to statistical instability.

GIS and Cartography: R. Degagne (2007)  
Data Sources: ESRI; US Postal Service; CCRP Rural Health Information Survey 2006.

Exhibit 13



## Discussion

*It is clear from the survey results that there are disparities among residents of the Redwood Coast Region with regard to what many would consider basic household amenities: phones, computers and Internet access.*

These disparities are most apparent for those living in households with income levels below the FPL, but even for those with incomes above the FPL there is limited access to some of these basic amenities.

Respondents living in low population density areas are less likely to have these basic amenities than those living in higher population density areas.

These results are not surprising, but they are concerning, particularly given the association between poor connectivity and difficulty obtaining needed health care. The author is not aware of any other study that has measured connectivity and its relationship to health care access in rural communities.

Most studies, by design, make the assumption that people at least have phones. The finding that 14.2% of the poorest households do not have phones should be considered when relying on data sources that only sample households with phones (such as the California Health Interview Survey).<sup>6</sup> This is particularly relevant in areas with high poverty rates, such as the Redwood Coast Region where 18.3% of the total population lives below the FPL (compared to 13.9% for the state of California).<sup>7</sup>

There are certainly many complex factors that can impact access to health care in rural communities, particularly those associated with poverty and geographic isolation. Further analysis of the Rural Health Information Survey will provide a greater understanding of the factors impacting access to health care in our region.

### Next Steps...

The California Center for Rural Policy will continue to share research results with the community through briefs, reports and meetings.

We plan to engage the community in dialogue about potential solutions and policy recommendations to address identified problem areas.

We hope you will join us as we work together to improve health in our region.

If you would like to receive information from CCRP please contact us to get on our mailing list:

California Center for Rural Policy  
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### Limitations

In an attempt to keep the survey a reasonable length and obtain information about a wide range of health related topics, the Rural Health Information Survey asked respondents if they had Internet access in their home, but did not distinguish between dial-up and broadband or between service availability and subscribership. Other projects are currently underway that will provide us with maps showing the distribution of broadband availability. The survey did not distinguish between cell phones or land lines when asking about having a phone in the home.

This study provides information about the respondents of the survey and does not necessarily describe the population in general. However, this is the largest study ever conducted in this rural region of California.

## Methods and Demographics

### Exhibit 14: Methods

The Rural Health Information Survey was conducted by the California Center for Rural Policy in the fall of 2006. The purpose of the survey was to assess health disparities, access and utilization of healthcare, and other determinants of health among residents in rural Northern California with the goal of providing useful information for planning and policy development.

A four-page self-administered survey was developed by project administrators at CCRP. The survey instrument was based on existing surveys (Behavioral Risk Factor Surveillance Survey, California Health Interview Survey, Canadian Community Health Survey and Mendocino Community Health Survey). New questions were developed as needed to inquire about areas of rural health not previously explored, such as access to transportation, phones, computers and Internet as well as skills for responding to emergency medical situations.

A total of 23,606 surveys were mailed to a random sample of adults residing in the four counties of Humboldt, Del Norte, Trinity and Mendocino. The sampling strategy employed the use of a Geographic Information System (GIS) to map the population density for Zip Code Tabulation Areas (ZCTA)<sup>8</sup> with an overlay of the locations of post offices. All of the post offices in low population density areas (<11 people per square mile) were selected (total post offices = 24; total post office boxes = 8165). Post offices located in higher population density areas ( $\geq 11$  people per square mile) were randomly selected (total post offices = 19; total post office boxes = 15,441) (Exhibit 1).

The total number of returned surveys was 3,003 for an overall response rate of 12.7%. A total of 2,950 surveys provided usable responses for analysis. Responses were analyzed with SPSS version 14.0. Chi Square was used to test for differences between groups with a *p*-value less than .05 considered statistically significant.

Sample Demographics are presented in Exhibit 15.

A total of 41.4% of the sample lives in a low-income household (<200% FPL).

### Exhibit 15: Sample Demographics

Characteristics	Frequency	Percent
<b>Federal Poverty Level<sup>9</sup></b>		
≤99% Poverty	416	16.2
100%-199%	645	25.2
200%-299%	491	19.2
≥300%	1009	39.4
Total	2561	100.0
<b>Ethnicity</b>		
White	2459	84.2
African American	7	0.2
Latino/Latina	34	1.2
Asian	13	0.4
Native American	148	5.1
Multiracial	173	5.9
Other	87	3
Total	2921	100
<b>Gender</b>		
Female	1882	64.1
Male	1053	35.9
Other	2	0.1
Total	2937	100
<b>Age (mean = 55.3)</b>		
18-29	173	6.0
30-39	240	8.3
40-49	455	15.7
50-59	930	32.2
60-69	656	22.7
70-79	310	10.7
≥ 80	126	4.4
Total	2890	100
<b>County of Residence</b>		
Del Norte	421	14.3
Humboldt	880	29.8
Trinity	940	31.9
Mendocino	705	23.9
More than 1 of above	4	0.1
Total	2950	100

Source: Rural Health Information Survey, 2006, California Center for Rural Policy.



# Acknowledgements and References

## Acknowledgements

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- Undergraduate Student Research Assistants: Kali Patterson, Jenna Barry, Katie Camarata, Rose Urich, Ruthie Maloney, Liz Hannig, Nanette Yandell, Sadie LaBrie, Jillian Jackson, Julie Newby-Wadsen, Jean Sebastien Pradel, Juliet Thrapp
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- Rollin Richmond, PhD, Humboldt State University President & Denice Helwig, Special Assistant to the President
- Consultant: Connie Stewart
- Administrative Assistant: Kristina Kruse

## References and Notes

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9. Poverty Thresholds obtained from U.S. Census Bureau, "Poverty Thresholds 2006" <http://www.census.gov/hhes/www/poverty/threshld/thresh06.html> accessed May 2007.

## About the Author

Jessica Van Arsdale, MD, MPH is the Director of Health Research at the California Center for Rural Policy, Humboldt State University. She was born and raised in northern Mendocino County (yes it is true, she was born in a potato chip truck). She received her bachelor's degree from the University of California, Berkeley and her Medical Degree from the University of California, San Francisco. She completed a residency in Family Medicine and Preventive Medicine at Oregon Health and Science University and concurrently completed a Masters in Public Health at Portland State University.

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# Notes

# Notes



The California Center for Rural Policy at Humboldt State University is a research center committed to informing policy, building community, and promoting the health and well-being of rural people and environments.

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